

Serial No. 09/_____ "CHEMICAL DERIVATIZATION OF SINGLE-WALL CARBON NANOTUBES TO FACILITATE SOLVATION THEREOF; AND USE OF DERIVATIZED NANOTUBES TO FORM CATALYST-CONTAINING SEED MATERIALS FOR USE IN MAKING CARBON FIBERS" to Margraves et al., (Attorney Docket No. 11321-P028US), filed concurrent to the date of this Application; and

Serial No. 09/_____ "CHEMICAL DERIVATIZATION OF SINGLE-WALL CARBON NANOTUBES TO FACILITATE SOLVATION THEREOF; AND USE OF DERIVATIZED NANOTUBES TO FORM CATALYST-CONTAINING SEED MATERIALS FOR USE IN MAKING CARBON FIBERS" to Margraves et al., (Attorney Docket No. 11321-P029US), filed concurrent to the date of this Application.

IN THE CLAIMS:

Please delete claims 1-51 without prejudice or disclaimer.

Please add new claims 52-96 listed below.

1 52. (New) A single wall carbon nanotube having one or more substituents covalently
2 bonded to a sidewall of the single wall carbon nanotube.

1 53. (New) The single wall carbon nanotube of claim 52, wherein the substituents are
2 selected from the group consisting of alkyl, acyl, aryl, aralkyl, halogen, substituted thiol,
3 unsubstituted thiol, substituted amino, unsubstituted amino, hydroxy, and OR', wherein R' is selected
4 from the group consisting of hydrogen, alkyl, acyl, aryl, aralkyl, halogen, substituted thiol,
5 unsubstituted thiol, substituted amino, unsubstituted amino, a linear carbon chain, and a cyclic
6 carbon chain.

1 54. (New) The single wall carbon nanotube of claim 53, wherein the linear carbon chain
2 or the cyclic carbon chain or both is substituted with at least one heteroatom.

1 55. (New) The single wall carbon nanotube of claim 53, wherein the linear carbon chain
2 or the cyclic carbon chain or both is substituted with one or more of the group consisting of =O, =S,
3 hydroxy, an aminoalkyl, an amino acid, and a peptide of 2-8 amino acids.

1 56. (New) The single wall carbon nanotube of claim 52, wherein the substituents are
2 alkyl or phenyl.

1 57. (New) The single wall carbon nanotube of claim 52, further comprising metal
2 complexed to at least one of the substituents.

1 58. (New) The single wall carbon nanotube of claim 57, wherein the metal is selected
2 from the group consisting of Group VI B metals and Group VIII B metals.

1 59. (New) The single wall carbon nanotube of claim 52, wherein the amount of
2 substituent bonded to carbon atoms of the single wall carbon nanotube is at a substituent to carbon
3 ratio of from (a) one substituent to about 26 carbon atoms to (b) one substituent to about two carbon
4 atoms.

1 60. (New) The single wall carbon nanotube of claim 59, wherein the amount of
2 substituent bonded to the carbon atoms of the single wall carbon nanotube is at a substituent to
3 carbon ratio of from (a) one substituent to about ten carbon atoms to (b) one substituent to about two
4 carbon atoms.

1 61. (New) The single wall carbon nanotube of claim 60, wherein the amount of
2 substituent bonded to the carbon atoms of the single wall carbon nanotube is at the substituent to
3 carbon ratio of from (a) one substituent to about three carbon atoms to (b) one substituent to about
4 two carbon atoms.

1 62. (New) A product made by the process of covalently bonding substituents to carbon
2 atoms on a sidewall of the single wall carbon nanotube.

1 63. (New) The product of claim 62, wherein the substituents are selected from the group
2 consisting of alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted
3 amino, unsubstituted amino, hydroxy, and OR', wherein R' is selected from the group consisting of
4 hydrogen, alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted amino,
5 unsubstituted amino, a linear carbon chain, and a cyclic carbon chain.

1 64. (New) The product of claim 63, wherein the linear carbon chain or the cyclic carbon
2 chain or both is substituted with at least one heteroatom.

1 65. (New) The product of claim 63, wherein the linear carbon chain or the cyclic carbon
2 chain or both is substituted with one or more of the group consisting of =O, =S, hydroxy, an
3 aminoalkyl, an amino acid, and a peptide of 2-8 amino acids.

1 66. (New) The product of claim 62, wherein the substituents are selected from the group
2 consisting of fluorine, alkyl and phenyl.

1 67. (New) The product of claim 62, further comprising the step of complexing a metal
2 to at least one of the substituents.

1 68. (New) The product of claim 67, wherein the metal is selected from the group
2 consisting of Group V I B metals and Group VIII B metals.

1 69. (New) The product of claim 62, wherein the amount of substituent bonded to carbon
2 atoms of the single wall carbon nanotube is at a substituent to carbon ratio of from (a) one
3 substituent to about 26 carbon atoms to (b) one substituent to about two carbon atoms.

1 70. (New) The product of claim 69, wherein the amount of substituent bonded to the
2 carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one
3 substituent to about ten carbon atoms to (b) one substituent to about two carbon atoms.

1 71. (New) The product of claim 70, wherein the amount of substituent bonded to the
2 carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one
3 substituent to about three carbon atoms to (b) one substituent to about two carbon atoms.

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1 72. (New) A product made by the process comprising:

2 (a) fluorinating a single wall carbon nanotube;

3 (b) reacting the fluorinated single wall carbon nanotube with a compound containing
4 a substituent to covalently bond the substituents to the single wall carbon nanotube.

1 73. (New) The product of claim 72, wherein the substituents are selected from the group
2 consisting of alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted
3 amino, unsubstituted amino, hydroxy, and OR', a linear carbon chain, a cyclic carbon chain, and
4 peptide, wherein R' is selected from the group consisting of hydrogen, alkyl, acyl, aryl, aralkyl,
5 halogen, substituted thiol, unsubstituted thiol, substituted amino, unsubstituted amino, a linear
6 carbon chain, and a cyclic carbon chain.

1 74. (New) The product of claim 73, wherein the linear carbon chain or the cyclic carbon
2 chain or both is substituted with at least one heteroatom.

1 75. (New) The product of claim 73, wherein the linear carbon chain or the cyclic carbon
2 chain or both is substituted with one or more of the group consisting of =O, =S, hydroxy, an
3 aminoalkyl, an amino acid, and a peptide of 2-8 amino acids.

1 76. (New) The product of claim 72, wherein the substituents are alkyl or phenyl.

1 77. (New) The product of claim 72 made by the process further comprising the step of
2 complexing a metal to at least one of the substituents.

1 78. (New) The product of claim 77, wherein the metal is selected from the group
2 consisting of Group VI B metals and Group VIII B metals.

1 79. (New) The product of claim 72, wherein the amount of substituent bonded to carbon
2 atoms of the single wall carbon nanotube is at a substituent to carbon ratio of from (a) one
3 substituent to about 26 carbon atoms to (b) one substituent to about two carbon atoms.

1 80. (New) The product of claim 79, wherein the amount of substituent bonded to the
2 carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one
3 substituent to about ten carbon atoms to (b) one substituent to about two carbon atoms.

1 81. (New) The product of claim 80, wherein the amount of substituent bonded to the
2 carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one
3 substituent to about three carbon atoms to (b) one substituent to about two carbon atoms.

1 82. (New) The product of claim 72, wherein said step of fluorinating the single wall
2 carbon nanotube comprises exposing the single wall carbon nanotube to a fluorinating agent.

1 83. (New) The product of claim 82, wherein the fluorinating agent is selected from the
2 group consisting of fluorine, ClF_3 , BrF_3 , IF_5 , XeF_2 , XeF_4 , AgF_2 , and MnF_3 .

1 84. (New) The product of claim 82, wherein the fluorinating step occurs at a reaction
2 temperature up to about 500°C .

1 85. (New) The product of claim 82, wherein the reaction temperature is between about
2 250°C and about 400°C .

1 86. (New) A derivatized single wall carbon nanotube made by the process comprising the
2 steps of:

- 3 (a) reacting the single wall carbon nanotube with a fluorinating agent;
- 4 (b) solvating the single wall carbon nanotube from step (i); and
- 5 (c) reacting the fluorinated single wall carbon nanotube with a compound containing
6 a substituent to covalently bond the substituent to the single wall carbon nanotube.

1 87. (New) The derivatized single wall carbon nanotube of claim 86, wherein the
2 substituents are selected from the group consisting of alkyl, acyl, aryl, aralkyl, halogen, substituted
3 thiol, unsubstituted thiol, substituted amino, unsubstituted amino, hydroxy, and OR', wherein R' is
4 selected from the group consisting of hydrogen, alkyl, acyl, aryl, aralkyl, halogen, substituted thiol,
5 unsubstituted thiol, substituted amino, unsubstituted amino, a linear carbon chain, and a cyclic
6 carbon chain.

1 88. (New) The derivatized single wall carbon nanotube of claim 87, wherein the linear
2 carbon chain or the cyclic carbon chain or both is substituted with at least one heteroatom.

1 89. (New) The derivatized single wall carbon nanotube of claim 87, wherein the linear
2 carbon chain or the cyclic carbon chain or both is substituted with one or more of the group
3 consisting of =O, =S, hydroxy, an aminoalkyl, an amino acid, and a peptide of 2-8 amino acids.

1 90. (New) The derivatized single wall carbon nanotube of claim 86, wherein the
2 fluorinating agent is selected from the group consisting of fluorine, ClF₃, BrF₃, IF₅, XeF₂, XeF₄,
3 AgF₂, and MnF₃.

1 91. (New) The derivatized single wall carbon nanotube of claim 86, wherein the solvation
2 step comprises sonication.

1 92. (New) The derivatized single wall carbon nanotube of claim 86, wherein the solvation
2 step comprises using a solvent selected from the group consisting of an alcohol, CHCl_3 , and
3 dimethylformamide.

1 93. (New) The derivatized single wall carbon nanotubes of claim 92, wherein the alcohol
2 is selected from the group consisting of methanol, ethanol, 2,2,2-trifluoroethanol, 2-propanol,
3 2-butanol, n-pentanol, n-hexanol, cyclohexanol and n-heptanol.

1 94. (New) The derivatized single wall carbon nanotube of claim 86, wherein the amount
2 of substituent bonded to carbon atoms of the single wall carbon nanotube is at a substituent to carbon
3 ratio of from (a) one substituent to about 26 carbon atoms to (b) one substituent to about two carbon
4 atoms.

1 95. (New) The derivatized single wall carbon nanotube of claim 94, wherein the amount
2 of substituent bonded to the carbon atoms of the single wall carbon nanotube is at a substituent to
3 carbon ratio of from (a) one substituent to about ten carbon atoms to (b) one substituent to about two
4 carbon atoms.

1 96. (New) The derivatized single wall carbon nanotube of claim 95, wherein the amount
2 of substituent bonded to the carbon atoms of the single wall carbon nanotube is at the substituent to
3 carbon ratio of from (a) one substituent to about three carbon atoms to (b) one substituent to about
4 two carbon atoms.